



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001**

April 9, 2002

MEMORANDUM TO: Janet R. Schlueter, Chief
High-Level Waste Branch
Division of Waste Management
Office of Nuclear Material Safety and Safeguards

FROM: Robert M. Latta, Sr. On-Site Licensing Representative
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SUBJECT U.S. NUCLEAR REGULATORY COMMISSION ON-SITE
LICENSING REPRESENTATIVES' REPORT ON YUCCA
MOUNTAIN PROJECT FOR JANUARY 1, 2002, THROUGH
FEBRUARY 28, 2002

The purpose of this letter is to transmit the U.S. Nuclear Regulatory Commission (NRC) On-Site Representatives' (ORs) report for the period of January 1, 2002, through February 28, 2002.

This report highlights a number of Yucca Mountain Project activities of potential interest to NRC staff. The ORs continue to respond to requests from NRC Headquarters staff to provide various documentation and feedback related to Key Technical Issues (KTIs) and their resolution. During this reporting period, the ORs continued to observe activities associated with Yucca Mountain Site Characterization, KTIs, and auditing. The ORs also attended various meetings and accompanied NRC staff on visits to Yucca Mountain.

If you have any questions on this report or its enclosures, please call Robert Latta on (702) 794-5048; Jack Parrott on (702-794-5047) or Neil Coleman on (301) 415-6615.

Enclosures: U.S. Nuclear Regulatory Commission On-Site Licensing Representatives' Report
ESF/ECRB Plan View Alcove, Niche and Borehole Test Locations
Nye County Early Warning Drilling Program Drillhole Locations
ATC Site Layout/ATC Cross-hole Configuration

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ADAMS ACCESSION NUMBER: ML0

ADAMS DOCUMENT TITLE: U.S. Nuclear Regulatory Commission On-Site Licensing Representatives'
 Report on Yucca Mountain Project for January 1, 2002, through February
 28, 2002

☒ Publicly Available ☐ Non-Publicly Available ☐ Sensitive ☒ Non-Sensitive

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U.S. NUCLEAR REGULATORY COMMISSION
ON-SITE LICENSING REPRESENTATIVES' REPORT

NUMBER OR-01-02

FOR THE REPORTING PERIOD OF JANUARY 1, 2002 THROUGH FEBRUARY 28, 2002

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Enclosures

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1.0 EXECUTIVE SUMMARY

EVALUATION OF DEPARTMENT OF ENERGY'S (DOE'S) CORRECTIVE ACTION PROGRAM

On January 31, 2002, DOE released the Office of Civilian Radioactive Waste Management (OCRWM) Management Improvement Initiative (OMII). Based on the staff's initial review of this document it does not appear to be a comprehensive corrective action plan to address issues identified in the root cause analyses for Corrective Action Reports (CARs) BSC-01-C-001 and BSC-01-C-002. To gain a better understanding of DOE's plans for improving their corrective action process, a team of six technical specialists from the NRC and the Center for Nuclear Waste Regulatory Analysis participated in an on-site evaluation during the week of February 24 through 28, 2002.

The NRC staff determined that there is no direct linkage between OMII and the process described in AP-16.1Q "Management of Conditions Adverse to Quality." The Initiative contained no definitive schedule for implementation and no reference to a plan for the Office of Quality Assurance (OQA) or Bechtel/SAIC (BSC) Quality Assurance (QA) to audit the effectiveness of the implementation of corrective actions. The Initiative also references "Action Summaries" which detail the methods for implementing corrective actions and improvements for the management strategies. These Action Summaries, however, do not contain explicit commitments related to corrective actions.

Based on the results of the NRC staff's reviews and discussions with project personnel, it was determined that the OMII does not provide sufficient detail on how DOE plans to address the fundamental aspects of the root cause analysis or the recommended corrective actions. There are no specific commitments related to potential adverse trends concerning deficiencies identified during in-process reviews of the Science & Engineering Report (S&ER), the Preliminary Site Suitability Evaluation (PSSE), the Supplemental Science and Performance Assessment (SSPA), and the Integrated Safety Management System (ISMS). There are also no commitments to address the results of recent self-assessments or lessons learned from previous corrective actions. The document does not meet the commitments made by DOE in the September 6, 2001, NRC/DOE QA Meeting summary. As a result of the NRC staff's review seven open items were identified. These open items will be evaluated and the results will be documented in a future OR report.

VERTICAL AND HORIZONTAL REVIEWS OF SITE RECOMMENDATION DOCUMENTS

The ORs evaluated the results of the DOE horizontal document review of the Total System Performance Assessment for the Site Recommendation (TSPA-SR), the Supplement to the Draft Environmental Impact Statement (SEIS), the SSPA, volumes 1 and 2, the S&ER, and the PSSE. Based on the results of these evaluations, the vertical and horizontal review efforts appear to have been thorough and the categorization of the identified errors seems reasonable. However, the number of errors in and of themselves may not be representative of the extent of quality issues in the DOE documents.

RECURRING DEFICIENCIES

DOE OQA has completed the review of recurring deficiencies related to scientific notebooks and has developed program enhancements to reduce the number of errors. Progress related to the implementation of these program enhancements will be monitored and the results will be documented in a future OR report.

DOE AUDIT OF YUCCA MOUNTAIN SITE CHARACTERIZATION OFFICE

NRC, OR Open Item 01-01 related to the qualification and training of project personnel, remains open pending the review and evaluation of requested documentation.

GEOTECHNICAL INVESTIGATIONS

Remote cameras have not identified any drips occurring in the cross drift (the ECRB) through the end of February 2002. Relative humidity readings have reached almost 100% in the isolated tunnel sections.

Thermal conductivity boreholes at Station 16+62 are instrumented and collecting data. The two-hole array test is in a cool-down monitoring phase. The six-hole array at Station 15+35 has been heating up for several months and the three-hole test has begun heating.

The current infiltration rate on the trench in Alcove 8 remains the same, and the seepage rate in Niche #3 is roughly 5 percent of the infiltration rate. DOE will soon reduce the infiltration flux by about 50% to begin the next phase of infiltration testing. A small-diameter hole was drilled through the base of one of the trench sections, temporarily increasing the infiltration rate in this section.

DOE scientists are proceeding with a study to validate the presence of bomb-pulse Chlorine (Cl)-36 at two locations in the Exploratory Studies Facility (ESF). The new studies continue to show no bomb-pulse Cl-36 in the samples. DOE also presented an update on Cl-36 issues at the Nuclear Waste Technical Review Board meeting in Pahrump, NV, in January 2002. Research is focusing on whether earlier samples collected from tunnel walls might have become contaminated by dust from outside or by water used for various purposes in the tunnels.

The power to the heated drift (Alcove 5) was turned off in mid-January and cool-down of the facility is being monitored. DOE is sampling, logging, imaging, and making visual observations and video logs of the thermal test facility. The DOE study of elevated fluoride concentrations in water samples concluded that the source of the fluoride is the introduced test materials (i.e. Viton™ and/or Teflon™). Laboratory work is continuing to further evaluate these results.

DOE provided an update on the University of Nevada, Las Vegas (UNLV) fluid inclusion studies at the Nuclear Waste Technical Review Board (NWTRB) meeting in Pahrump, Nevada, in late January, 2002. DOE stated that the UNLV study results provide no evidence for the former presence of upwelling hydrothermal fluids. Overall, DOE concludes that the upwelling waters or seismic pumping hypotheses for the origin of secondary mineralization at the Yucca Mountain site have been adequately addressed and may be discounted.

At the Alluvial Tracer Complex, hydraulic tests were run in January. Single-well tracer tests have been completed. However, multi-well tracer tests will not begin until the State of Nevada approves the specific groundwater tracers that are planned to be used.

WASTE HANDLING BUILDING GEOTECHNICAL INVESTIGATION

DOE has completed the field work for the geotechnical investigation at the Yucca Mountain North Portal area. Draft reports are under development.

BUSTED BUTTE UNSATURATED ZONE TRANSPORT TEST

Atomic Energy of Canada, LTD., continued to perform radionuclide transport testing on blocks of rock extracted from the Busted Butte Test Facility. Chemically reducing conditions have been found within a block. The reasons for this are being reviewed.

ENGINEERED BARRIER SYSTEM (EBS) TESTING

Phase III of the Pre-closure ventilation testing is on hold pending evaluation of the tests and data needs. The test to study convective heat transfer in the post-closure time period is currently underway at the test facility.

NATURAL ANALOGS - PENA BLANCA TESTING

Drilling and testing activities at Pena Blanca, Mexico are expected to begin in the near future. As of late February, the drilling rig to be used onsite remains at the U.S. and Mexico border pending acquisition of Mexican permits.

REPORT DETAILS

2.0 INTRODUCTION

The principal purpose of the OR report is to inform NRC staff, managers, and contractors of information on the DOE programs for site characterization, repository design, performance assessment, and environmental studies that may be of use in fulfilling NRC's role during pre-licensing consultation. The primary focus of this and future OR reports will be on DOE's programs for the ESF, surface-based testing, performance assessment, data management systems, and environmental studies. Relevant information includes new technical data, DOE's plans and schedules, and the status of activities to pursue site suitability. The ORs also participate in activities associated with resolving NRC Key Technical Issues's (KTIs). This report covers the period of January 1, 2002, through February 28, 2002.

3.0 OBJECTIVES

The OR mission is to serve principally as a point of prompt informational exchange and consultation and to identify preliminary concerns about site investigations relating to potential licensing issues. The ORs accomplish this function by gathering information, communicating, consulting, and identifying concerns. Communication is achieved by exchanging information on data, plans, schedules, documents, activities and pending actions, and resolution of issues. The ORs interact with DOE scientists, engineers, and managers with input from NRC Headquarters management on NRC policy, philosophy, and regulations. The ORs also focus on such issues as QA, design controls, data management systems, performance assessment, and KTIs resolution. A primary OR role is to identify areas in site characterization and related studies, activities, or procedures that may be of interest or concern to the NRC staff.

4.0 QUALITY ASSURANCE AND ENGINEERING

Evaluation of DOE's Corrective Action Program

As previously documented in the NRC's On-Site Representatives Report Number OR-03-01, dated August 16, 2001, DOE identified two issues involving significant conditions adverse to quality. These issues included model validation errors and inadequate software controls in technical products that were documented as Corrective Action Reports (CARs). DOE issued CAR Number BSC-01-C-001 on May 3, 2001 concerning failure of project personnel to consistently implement applicable procedural requirements for model validation of the analysis model reports (AMR's) for the Total System Performance Assessment for the Site Recommendation (TSPA-SR). On June 12, 2001, DOE issued CAR Number BSC-01-C-002, documenting software configuration management deficiencies related to the following issues: inadequate procedural compliance, lack of supplemental procedures and ineffective training for software development. In addition, on May 17, 2001, the NRC sent a letter from William Reamer, to Stephen Brocoum (DOE), discussing apparent technical errors and/or

inconsistencies between the issued TSPA report and the TSPA-SR model. This letter requested that DOE identify the scope of the errors and evaluate the implication for the adequacy of DOE's performance assessment and the associated TSPA-SR documents.

During the September 6, 2001, Quarterly QA Meeting, DOE presented their proposed path forward for corrective actions to prevent recurrence of quality assurance deficiencies identified during the investigation into the two CARs. The path forward also addressed the errors identified by NRC in the TSPA-SR and other technical documents. During this meeting, DOE stated that they would develop a comprehensive corrective action plan that would address the cause of the problems identified during their investigation and a "Performance Improvement Transition Plan" to improve the level of performance of QA program implementation. As documented in the September 6, 2001, QA meeting summary, DOE stated that their Performance Improvement Transition Plan (the Plan) would specifically address the following items:

- Software and modeling results and corrective action results and recommendations including root cause analysis, generic implications and common cause results
- TSPA root cause results and recommendations including common cause and actions to prevent recurrence
- A comprehensive evaluation of the results of the vertical and horizontal document reviews conducted on the S&ER, PSSE and SSPA for the purpose of ensuring that any additional adverse trends were appropriately addressed in the Plan
- The results of the TSPA audit would be effectively integrated into the Plan
- Coordination of the DOE Integrated Safety Management System (ISMS) with QA program initiatives including the closure of ISMS issues resulting from self-assessments
- Results of self-assessments performed during the last months
- Lessons learned from previous corrective actions including the differences between this plan and previous initiatives
- QA Management Assessment (QAMA) review results

Furthermore, it was stated that performance measures would be defined to evaluate both progress and implementation and the effectiveness of the actions to ensure continuous improvement as part of the plan provided to the NRC. As described during this meeting, BSC QA would conduct both performance and compliance-based audits and surveillance of in-process activities to confirm effective implementation of corrective actions. These efforts were to have been verified by DOE OQA through progressive reviews and confirmation of completed corrective actions. As part of these efforts, DOE committed to providing the scope and time frame of the consolidated oversight activities as part of the Plan when it was delivered to the NRC.

The NRC developed a team of six technical specialists to gain a better understanding of DOE's plans for improving their corrective action process. This team comprised NRC staff, including the ORs, and personnel from the Center for Nuclear Waste Regulatory Analysis. The team conducted an evaluation of the documentation associated with CARs BSC-01-C -001 and -002 and the errors that NRC identified in other project related documents. During the week of February 24 through 28, 2002, in an on-site visit, the NRC team reviewed the OCRWM Management Improvement Initiative (OMII), procedure AP-16.1Q "Management of Conditions Adverse to Quality," and selected documents related to the corrective action program (which are discussed below). The NRC team conducted discussions with the cognizant DOE/BSC site personnel associated with the root cause evaluations for CARs BSC-01-C -001 and -002, and related technical document deficiencies. The NRC team also evaluated the lessons learned from previous CARs and the actions to prevent recurrence. This evaluation focused on determining if appropriate management actions were directed at the development of corrective actions to prevent recurrence. They also evaluated if conditions adverse to quality were resolved in a timely manner, if there were failures of past corrective actions, and if a definitive set of performance measures was developed. The objective of the evaluation was to determine the adequacy of DOE's commitments to improve the corrective action process. This included assessing actions being taken to resolve CARs BSC-01-C -001 and -002 and ascertaining DOE's progress toward implementing a QA program. The overall goal of the team's activities is to increase NRC's confidence in the quality of DOE's activities leading up to a license application.

OCRWM Management Improvement Initiative (OMII)

On January 31, 2002, DOE released the OCRWM Management Improvement Initiative (OMII). The NRC staff's initial review of OMII determined that it does not appear to be a comprehensive corrective action plan to address issues identified in the root cause analyses for CARs BSC-01-C-001 and -002 or the errors identified by the NRC. The introductory section of the Initiative states that, "This document is intended to be a living document that highlights areas needing improvement and helps focus work, rather than a corrective action plan resulting from the CARs or root cause analysis. Although initiatives address recommendations identified by root cause analyses associated with the referenced CARs, specific CAR corrective actions will be resolved and monitored via procedure AP-16.1Q, *Management of Conditions Adverse to Quality*."

The review of the OMII showed it was not developed and controlled in accordance with the AP16.1 process. The OMII also does not have a definitive schedule for implementation and there is no reference to a plan for OQA or BSC QA to audit the effective implementation of corrective actions. The final responses to the CARs have not been completed, even though these adverse conditions were identified more than eight months ago. The OMII also references "Action Summaries" which detail the methods for implementing corrective actions and improvements for the management strategies. However, the Action Summaries are incomplete and do not contain explicit commitments related to corrective actions. The NRC staff's reviews and discussions determined that the OMII does not provide sufficient detail on DOE's plans to effectively address the fundamental aspects of the root cause analysis or the recommended corrective actions. Other weaknesses include the absence of specific commitments related to potential adverse trends concerning deficiencies identified during in-

process reviews of the S&ER, PSSE, SSPA, and ISMS. The results of recent self-assessments, and lessons learned from previous corrective actions are also not included. The OMII does not fulfill the commitments DOE made in the September 6, 2001, NRC/DOE QA meeting. It does not provide: (1) adequate actions to prevent recurrence, (2) a schedule for implementation, (3) definitive performance measures, or (4) a schedule of audits to verify implementation. The review team provided DOE/BSC with our observations at the end of the visit.

Corrective Action Procedure

The process for dealing with conditions adverse to quality at Yucca Mountain is controlled by procedure AP-16.1Q "Management of Conditions Adverse to Quality," Revision 4 dated December 20, 1999. This procedure establishes the use of deficiency reports (DRs) for non-significant deficiencies and CARs for significant deficiencies. Attachment 1, to AP-16.1Q provides detailed information for determining whether an issue is a DR or a CAR. For issues not rising to the level of significance of a DR or CAR, the Conditions/Issues Identification Reporting Resolution System (CIRS) is used. A person familiar with the requirements of AP-16.1Q screens issues entered into CIRS to ensure that any conditions adverse to quality are elevated to the DR/CAR process.

The NRC team determined that procedure AP-16.1Q appropriately addresses those elements necessary for managing conditions adverse to quality. Clear guidance and responsibilities for processing the DR/CAR are provided and the instructions are clear and easy to follow. Criteria for determining if an issue is a DR or CAR are provided, including conditions that would justify a stop work order. For DR/CARs that are voided by OQA and no action is taken, a justification is required and the initiator's concurrence or acknowledgment is obtained. However, no requirement is included in the procedure for ensuring that concurrence or acknowledgement is obtained from the initiator after corrective actions are taken and the DR/CAR is ready for closure. Nor does OQA have a formal program requiring periodic evaluation of closed DR/CARs to verify that the Initiator of the DR/CAR is satisfied with the closure actions taken. Therefore, there is no clear closure mechanism for the process. Without this closure, failure to adequately address the initial issue and take appropriate corrective actions could occur and the DR/CAR could be closed without effectively resolving the issues.

In general, the NRC staff concluded that the procedure for controlling the corrective action process is adequate. However, the NRC staff did not find a formal mechanism within the procedure or the QA audit program to verify that DRs and CARs being closed had adequately resolved the issue originally presented by the initiator of the DR/CAR.

Software Issues

The effective implementation of corrective and preventive actions for DRs/CARs related to software has been a continuing problem for the project. On June 12, 2001, CAR BSC-01-C-002 was issued related to software deficiencies. This CAR was initiated by the employee concern program as the result of 15 documented employee concerns. The NRC staff reviewed this CAR to ascertain if the requirements of procedure AP-16.1Q are properly implemented and to determine if the DR/CAR program appropriately addressed the identified deficiencies and

software concerns. At the time of the NRC staff's review this CAR was approximately nine months old and the final responses had not been accepted by OQA.

CAR BSC-01-C-002 identified several problems related to independent verification and validation of software, control of codes, procedural compliance and training inadequacies. Additionally, CAR BSC-01-C-002 stated that previous attempts to correct certain software related problems through the DR/CAR process were ineffective. Specifically, CAR BSC-01-C-002 documented that two previous CARs had been issued relating to software problems. These included CAR LVMO-98-C-006, dated February 10, 1998, that identified configuration management problems related to software control and CAR LVMO-00-C-001, dated March 2, 2000, which was issued because the corrective actions identified in CAR LVMO-98-C-006 had been inadequately implemented and had failed to correct the problems with the recurrence of software deficiencies. It is significant to note that two out of the three CARs stated that previous closure of a CAR had not adequately addressed the issue. It is also noteworthy that the third CAR was a result of issues identified through the employee concern program and not through the normal line/management process for initiating DR/CARs.

Based on a review of the DR/CARs database, the NRC staff determined that, in the last four years a total of 54 DR/CARs related to software had been issued. Although the large number of DR/CARs reflects a willingness of the Yucca Mountain Project staff to identify and document problems related to software, the cumulative impact and significance of these issues should have resulted in greater management attention. However, there is no objective evidence to indicate that the 54 DR/CARs have been collectively evaluated to determine how many of these issues were recurring or related problems.

During the review of the issues documented in CAR BSC-01-C-002, the NRC staff identified additional information related to the original concerns documented by the employees that provided the basis for the information included in CAR BSC-01-C-002. This information was presented in a Concerns Program Final Report, which was issued on September 14, 2001. This report effectively summarized the fifteen concerns related to software issues documented during interviews conducted by the employee concern program. However, this report which had a limited distribution and was stamped "eyes only" had not been provided to either the responsible BSC line organization for consideration during the development of the CAR final response or to OQA for evaluation of the CAR corrective actions. This condition was partially attributed to the fact that the Concerns Program Final Report had been released after the CAR was issued and after the root cause analysis for the CAR had been completed on August 8, 2001. Because the report had been marked "eyes only," indicating that it was sensitive material, copies of the report had not been forwarded to the responsible BSC line organization or OQA. The CAR had been written as a summary of the constituent issues, therefore a number of specific items that were documented in the Concerns Program Final Report as key elements of the problem, were not explicitly documented in the description-of-condition block of the CAR.

During a subsequent discussion with OQA, it was determined that without the detailed information contained in the Concerns Program Final Report, the basis for review and acceptance of the proposed resolution of CAR BSC-01-C-002 may not adequately address each of the issues. Accordingly, there is the potential for CAR BSC-01-C-002 to be closed without adequately addressing the specific concerns presented by the employees. Although

the Concerns Program Final Report clearly described each of the concerns and stated that they would be resolved through the CAR resolution process, neither the responsible BSC line organization nor OQA staff working on the CAR was aware of its existence. Based on the NRC staffs review of the pertinent documents including the Concerns Program Final Report, it was apparent that in order to effectively address the specific initiating issues related to CAR BSC-01-C-002, the responsible BSC line organization and OQA should have received a copy of this document.

In summary, the projects previous corrective actions to resolve DR/CAR issues related to software and prevent recurrence have not been effective. The root cause analysis for CAR BSC-01-C-002 appears thorough and presents an appropriate analysis of the problems. However, the failure to properly include the specific issues identified in the Concerns Program Final Report in the resolution process, may result in the potential closure of this CAR without adequately addressing the original employee concerns. Therefore, pending the clarification/resolution of this issue it is identified as OR Open Item 02-01.

Model Validation

In order to evaluate the actions taken by DOE as part of the corrective actions for model validation as described in CAR BSC-01-C-001, NRC staff reviewed the pertinent documents and conducted discussions with cognizant site personnel including a representative of the Chief Science Officer (CSO). These activities were performed to develop confidence in DOE's actions to resolve model validation deficiencies for TSPA-SR prior to a potential license application. As determined during these evaluation activities a number of corrective actions have been completed, or are being considered, in an attempt to prevent recurrence. These activities included the following: procedure revision/replacement, training enhancements, additional guidance development, improved project planning and work management, and improved procedure ownership and change control.

NRC staff also reviewed the Scientific Processes Guidelines Manual, MIS-WIS-MD-00001 Revision 00, dated December 2001, Science Procedures Transition Overview, BRETEC02-003, Revision 0, and AP-SIII.10Q, Model Validation Techniques, LPTEC02-001, Revision 0. As a result of the reviews, NRC staff determined that a number of desirable improvements have been implemented in the revised documentation. In addition, the reorganization of the process for document development and review which requires the approval of the CSO, should reinforce the criteria and expectations related to model validation such that they are consistently and uniformly applied to all AMR's.

During these reviews the NRC staff identified a potential area of concern related to the corrective actions for the criteria and expectations in the revised procedures and training materials. Based on discussions with the CSO's representative, NRC staff determined that DOE/BSC were in agreement with NRC expectations for model validation. However, the corrective actions appear to place an excessive burden on the CSO to ensure the model validation activities meet project expectations. An alternative to the established process would be to revise the appropriate documentation so that the expectations verbally expressed by the CSO representative are reflected in the procedure and written training materials (the CSO representative indicated that the expectations for model validation were verbally communicated to the training attendees). The following items represent issues identified by the NRC staff and

communicated to DOE during the review:

- 1) Current process controls specify that one (or more) of nine criteria may be utilized to validate a model. Although all of the criteria should increase confidence in the modeling process, some of the criteria, by themselves, do not appear to be appropriate for addressing whether the model is valid for its intended use. Therefore, pending the clarification/resolution of this issue it is identified as OR Open Item 02-02.
- 2) The more objective criteria (e.g. comparison to data not used in the development of the model) that typically result in higher confidence in model validation are not distinguished from the more subjective, and thus, problematic criteria (in the written materials). Therefore, pending the clarification/resolution of this issue it is identified as OR Open Item 02-03.
- 3) A number of criteria have been developed related to various forms of review. If a review is relied upon for model validation, it should be directed at validating the model and it should encompass the full body of information to the extent practical (e.g. references, alternative models, supporting documents). Therefore, pending the clarification/resolution of this issue it is identified as OR Open Item 02-04.
- 4) Provisions are in place that allow for model validation to continue past issuance of the documentation. While additional information to further support models is beneficial, the models used in the performance assessment should have adequate support for their representation at the time the performance assessment documentation is issued. Therefore, pending the clarification/resolution of this issue it is identified as OR Open Item 02-05.

Overall, DOE is appropriately addressing the issues related to model verification. However, as noted above, several issues have been identified as open items that will be reviewed by the NRC staff upon completion of the corrective actions associated with CAR BSC-01-C-001.

Summary of Conclusions Related to CARs BSC-01-C-001 & -002

Based on the NRC staff's review of CARs BSC-01-C-001 and -002 and related documents, it was concluded that OQA has been very effective in identifying adverse conditions and areas for improvement, and in the characterization of the issues controlled under the AP-16.1 process. The NRC staff also determined that the project performed a comprehensive and detailed root cause evaluation and that the root cause analyses adequately characterized the root, common, and generic causes of the identified deficiencies. However, it was noted that DOE disagreed with three of the common causes and one software root cause and that BSC did not explicitly carry these issues through for corrective action. Relative to this issue, the NRC staff determined that without appropriately addressing the full range of common and generic causes, the potential exists for inadequate corrective actions. The NRC staff also determined that information from the employee concerns program final report necessary for the adequate closure of the CAR BSC 01-C-002 was not provided to either the responsible BSC line organization or OQA. Additionally, the NRC staff identified a concern that DR/CARs are routinely closed without concurrence of the originator to ensure that the corrective actions adequately address the issues identified by the initiator.

Previous Corrective Actions

As discussed above, the corrective actions for specific DR/CARs identified prior to BSC-01-C-001 and -002 (i.e., CARs 98-02, -005, -006, -010 and 00-01) had been ineffective in preventing recurrences, as evident by the issuance of CARs BSC-01-C -001 and -002. During a discussion with DOE management, a number of issues were presented that had contributed to the problems with ineffective corrective actions associated with previous CARs. The NRC agrees that the following issues affected the adequate closure of the CARs:

- Root cause analyses were not being performed in a timely manner in that some were not conducted until 9 to 17 months after issuance of the CARs,
- Corrective actions did not consider common or generic causes,
- Remedial and corrective actions to prevent recurrence were formulated and implemented prior to identification of the root causes, so the corrective actions did not match root causes,
- Root causes were edited to conform to the previously formulated corrective actions,
- Corrective actions were not incorporated into the baseline and schedules,
- Other work was given higher priority than corrective action,
- Stand-downs were not used to focus on corrective action efforts, and
- Performance measures were not developed to assess implementation progress and effectiveness

In contrast to the previous ineffective corrective actions, the corrective actions associated with CARs BSC 01-C-001 and -002 have resulted in the following:

- Timely conduct of an independent root cause analysis.
- Corrective actions are incorporated into the baseline and are budgeted.
- Corrective actions have high-level management attention

TSPA-SR Deficiencies

To evaluate the actions being taken by DOE to address the Technical Document Deficiencies, NRC staff conducted discussions with selected project personnel and reviewed documentation associated with the OMII. Staff determined that the primary causes of the Technical Document Deficiencies were that scope and schedule changes forced compression of the checking and review process. In addition, parallel reviews that lacked revision control had a negative impact on the process.

Based on the documentation reviews and discussions with project personnel, the proposed actions to resolve these issues appeared reasonable. However, the specific actions that are planned to correct this problem and prevent recurrence are not yet available. The only

concerns identified at this time by the NRC are related to specific items identified in the Findings of the Technical Review of the Total System Performance Assessment for Site Recommendation (Self-Assessment Report SA-PROJ-2001-001), which, identified a number of discrete causes. It would be beneficial if the corrective actions for these items were carried forward to address the identified causes. In addition, the confidence in the implementation of future TSPA's could be increased by a deeper and more rigorous checking and review process.

Unqualified Data Impact Assessment

The NRC staff determined that information originally classified as *unqualified data* was being changed to *assumptions*. The current project procedures allow this practice and the result is closure of the associated data qualification issues. However, it was not apparent how this process will appropriately represent the uncertainty associated with unqualified data.

The NRC staff also identified unqualified data that could be replaced with qualified data for the performance assessment. The NRC recognizes that unqualified data has a lower degree of credibility, and its use in the performance assessment, which is intended to represent known sources of uncertainty, may be problematic. For risk-significant components, an evaluation of unqualified data that is replaced by qualified data, would help determine whether efforts should be undertaken to qualify the removed data. Also, the comparison may provide an additional source of information (corroboration) that the uncertainty and variability assigned to the qualified data is appropriate. Therefore, pending the clarification/resolution of this issue it is identified as OR Open Item 02-06.

Model Validation Impact Assessment

The model validation impact assessment addressed the effect of inappropriately validated models on TSPA-SR. In many cases these impact assessments used TSPA-SR results to evaluate the local impacts. It is unclear how this practice evaluated the cumulative impact of all the models in question, any potential synergisms between different models, and additional uncertainty associated with using models having inadequate confidence. Therefore, pending the clarification/resolution of this issue it is identified as OR Open Item 02-07.

Vertical and Horizontal Reviews of Site Recommendation Documents

During this reporting period the ORs examined information documenting the results of BSC's vertical and horizontal reviews of site recommendation documents. These reviews were initiated in response to TSPA-SR inconsistencies that were identified by the NRC staff and documented in a letter from William Reamer to Stephan Brocoum, (DOE), dated May 17, 2001. The site recommendation documents reviewed by DOE for quality concerns included: TSPA Model for Site Recommendation, TSPA-SR, Supplement to the Draft Environmental Impact Statement (SEIS), SSPA, volumes 1 and 2, S&ER, and PSSE.

The stated objectives of the vertical and horizontal reviews were to assure consistency of inputs and conclusions among documents and assure traceability, consistency, and links to supporting models. The reviews included documents that were completed (e.g., TSPA-SR) and documents that were still under development (e.g., SSPA). The comments resulting from these reviews were placed in one of the following four categories: (1) significant items that could

affect a major calculation in support of the TSPA, (2) important items that could affect a supporting calculation, but would not change the conclusions of the TSPA; (3) comments about a weak basis or assumption or text, or (4) minor errors or editorial comments.

The objectives of the ORs review were as follows: (1) examine the comments identified during the vertical and horizontal reviews and their categorization to better understand the review process and the extent of the quality-related issues in the DOE documentation, (2) use potential errors identified by NRC subsequent to the May 17, 2001, letter to gauge the effectiveness of the reviews, (3) evaluate the technical concerns identified during the vertical and horizontal reviews, and (4) gain a better understanding of the status of DOE's efforts to identify, track, and resolve errors found in reviewed documents.

The ORs review included the following documents: the Horizontal Document Review Comments for the Total System Performance Assessments (TSPA), the Supplement to the Draft Environmental Impact Statement (SEIS), the Science and Performance Analyses (SSPA), volumes 1 and 2, the Science and Engineering Report (S&ER), and the Preliminary Site Suitability Evaluation (PSSE), the Horizontal Review Comment Resolution for the SSPA Document Review, the Projects Self-Assessment Report: Findings of the Technical Review of the Total System Performance Assessment for Site Recommendation (SA-PROJ-2002-004), Management Review of SSPA Volumes 1 and 2, Final Report. The results are summarized below.

- 1) The number of reported errors may not be representative of the extent of quality issues. Specifically, category 1 and category 2 errors provide a better measure than the category 3 and 4 errors. This appears to be particularly true for errors placed within category 3 or category 4 related to documents that were undergoing normal review concurrent with the horizontal review. In addition, there were many instances where a category 3 or 4 error corresponds to a suggested improvement or a question where BSC determined that no changes were necessary appropriately respond to the comment.
- 2) The categorization process performed during the vertical and horizontal reviewers is considered to be generally reasonable, with few exceptions such as a category 3 comment on model calibration that could be rated higher.
- 3) Although it was not possible to verify that each of the more recent potential errors identified by NRC reviewers was identified during the horizontal review, a sufficient number of these potential errors were identified either directly or indirectly which provides a greater level of confidence that the review efforts were thorough.
- 4) Examples of BSC-identified comments were found, where additional follow-up might be expected; however it was not always possible to determine whether follow-up action was taken. This may be attributable to the nature of the BSC-review process (i.e., to identify traceability, consistency, and reference issues in a select set of documents) and it did not appear to adversely impact the fidelity of the documents.
- 5) The NRC-identified errors from the initial TSPA-SR review included a large fraction (6 out of 10) of the errors found in category 1 (significant items) and a smaller fraction (1 out of 57) of the errors found in category 2 (important items).

6) The procedure used to identify and resolve technical errors, which relied on the CIRS program for tracking, is being revised. Starting in November 2001, the previous approach was discontinued and interim measures have been used to develop a list of known technical errors. Because of the transitional status of the approach used to identify and track errors identified within checked documents, it was not possible to ascertain whether improvement in this area has been achieved.

Based on the review of the affected technical documents the vertical and horizontal review efforts appear to have been thorough. The categorization of the identified errors appears reasonable; however, the number of errors in and of itself may not be representative of the extent of quality issues in the DOE documents.

RECURRING DEFICIENCIES

OR Report -02-01, identified an adverse trend concerning recurring deficiencies in scientific notebooks. As a result of the increased number of deficiencies, DOE/OQA evaluated these conditions and developed several recommendations to enhance the program and reduce the incidence of errors in scientific notebooks. Progress related to the implementation of these program enhancements will be monitored and the results will be documented in a future OR report.

DOE QA AUDIT OF YUCCA MOUNTAIN SITE CHARACTERIZATION OFFICE

As documented in OR Report -04-01, the ORs observed DOE's QA audit of the Yucca Mountain Site Characterization Office (YMSCO) in Las Vegas, Nevada. The purpose of this audit was to evaluate the effectiveness of the Office of Civilian Radioactive Waste Management QA Program at the YMSCO office. Specifically, the audit team evaluated the implementation of selected requirements of DOE/RW-0333P, Quality Assurance Requirements and Description document and the associated procedures.

During the audit the ORs reviewed the Position Descriptions (PDs) of three employees in order to determine if these individuals possessed the necessary educational, training and work experience to demonstrate compliance with elements in their respective PDs. Based on the results of these reviews it was determined that two of the employees had the requisite qualifications and satisfied all elements of their PDs. However, evaluation of the remaining PD was left open, (NRC, OR Open Item 01-01) pending the receipt of additional training records. During this reporting period the ORs evaluated the supplemental training and qualification records for the third employee. Based on the results of these reviews it could not be objectively determined that the individual had received all of the necessary training and job related experience to satisfy specific elements delineated in the PD. Accordingly, the ORs requested additional documentary information related to the qualifications and training for this individual. Pending the review and evaluation of requested documentation this item will remain open.

5.0 OUTREACH ACTIVITIES

Clark County Yucca Mountain Nuclear Waste Advisory Committee Meeting

On February 14, 2002, the ORs attended a public meeting of the Clark County Yucca Mountain Nuclear Waste Advisory Committee. The purpose of the meeting was to present an update on Yucca Mountain-related topics. The advisory committee discussed the status of the Yucca Mountain Project, options related to the potential site recommendation, and the expected release of the Department of Energy's Final Environmental Impact Statement. The committee addressed license application considerations and Yucca Mountain water rights issues. The committee also discussed the recently released Clark County Impact Assessment Report. This report provides Clark County's analysis of the potential impacts resulting from the construction, operation and closure of the proposed high-level waste repository. The meeting provided an opportunity for the effective exchange of information between the affected units of local government, community opinion leaders and local citizens.

6.0 GEOTECHNICAL INVESTIGATIONS AND NRC KEY TECHNICAL ISSUES

ENHANCED CHARACTERIZATION OF THE REPOSITORY BLOCK (ECRB)

The excavation of the ECRB, completed on October 13, 1998, allows the collection of scientific and engineering data in stratigraphic units that constitute the bulk of the potential repository horizon. DOE continues ECRB testing to maximize the data available to support DOE TSPA - Site Recommendation. Enclosure 2 describes the ESF and ECRB test locations. ECRB testing activities are summarized below.

Passive Hydrologic Test

During the previous reporting period project personnel installed enhanced monitoring and collection equipment, including remote cameras and moisture collection devices, in accordance with the revised test plan. Plastic sheets and drip cloths infused with a pH sensitive chemical were installed near the crown, and numerous sample bottles were placed to collect possible drips from rock bolts. A gas sampler was also installed. Rock samples were collected from both the Topopah Spring lower nonlithophysal and lower lithophysal zones for thermal conductivity measurements and analysis of geomechanical properties. Geologic mapping was also conducted. A new bulkhead was installed at Station 22+01, and on November 14, 2001, the bulkheads from Station 22+01 and beyond were closed. Additional sampling and equipment installation was done between Stations 17+63 and 22+01, and then the bulkhead at Station 17+63 was closed on December 20, 2001.

Remote cameras have not identified any drips occurring in the ECRB through February. Relative humidity readings have reached almost 100% in the isolated tunnel sections. DOE plans to keep the bulkheads in place for an indefinite period or until observations warrant tunnel entry for a closer look. The ORs will continue to monitor these test activities and document the results in future reports.

Niche #5

The results of previous infiltration testing are being reviewed. Infiltration testing is scheduled to resume in March, 2002.

Systematic Hydrologic Characterization (SHC)

During this reporting period, DOE continued to perform SHC testing in a series of 20 meter deep boreholes in the Topopah Spring lower lithophysal zone. Testing on existing arrays will be completed in March. Testing on the second FY02 array will begin in mid April. However, no additional systematic borehole drilling is planned for FY02.

In-Situ Thermal Conductivity Measurements

Thermal conductivity boreholes at Station 16+62 are instrumented and collecting data. Samples of tunnel wall rock have also been collected for thermal conductivity measurements. Because of their small size, these samples will likely provide less representative values of thermal conductivity than the larger-scale borehole thermal experiments. The two hole array test is in a cool down monitoring phase. Collection of baseline data for the six hole array at Station 15+35 was completed in the last reporting period and the array has been heating up for several months. The three-hole test began heating up about three weeks ago.

Alcove 8

The current infiltration rate on the trench in Alcove 8 remains approximately 9.0 liters per hour, and the seepage rate in Niche #3 is roughly 5 percent of the infiltration rate. The trench is divided into isolated sections, each of which is supplied with water for infiltration. DOE has deferred the start of infiltration on the 3 X 4 meter plot until testing on this fault is completed. Seepage testing on this fault continues through this reporting period and will likely continue through FY2002. DOE anticipates reducing the infiltration flux by about 50% to begin the next phase of infiltration testing in the near future.

During this reporting period a small-diameter hole was drilled through the base of one of the trench sections. As a result of this planned test activity the infiltration rate in this section increased from approximately 20 liters/day to approximately 200 liters/day. It appears that permeable fractures or lithophysae were encountered. Eventually, however, the infiltration rate returned to the initial rate of approximately 20 liters/day, indicating that the increased water storage was spatially isolated.

EXPLORATORY STUDIES FACILITY (ESF) TESTING

Seepage Testing

DOE has completed moisture monitoring and testing in Alcoves 1, 2, 6, and Niches 1, 2. Limited moisture monitoring and seepage testing continues at Alcoves 3, 4, 7 and Niches 3 and 4. Ongoing ESF testing activities are summarized below.

Chlorine-36 (Cl-36) Validation Study

DOE scientists are proceeding with a study to validate the presence of bomb-pulse Cl-36 at two locations in the ESF. Approximately 60 samples have been collected in the vicinity of the Drill Hole Wash Fault and the Sundance Fault where elevated concentrations of Cl-36 were detected in a previous Los Alamos study. These samples are being analyzed for Cl-36, tritium, technetium-99, and supplemented by analyses of uranium, thorium, iodide-129 and radium isotopes. The new studies continue to show no bomb-pulse Cl-36 in the samples. On January

16, 2002, DOE conducted an internal workshop on CI-36. This technical exchange was held at the Federal Center in Denver, Colorado. Participants included staff from the USGS, DOE, Lawrence Livermore National Lab, and Los Alamos National Lab.

DOE also presented an update on CI-36 issues at the January 29-30, 2002, Nuclear Waste Technical Review Board meeting in Pahrump, Nevada. Research is currently focusing on whether earlier samples collected from tunnel walls might have become contaminated by dust from outside or by water used for various purposes in the tunnels. Further validation work will emphasize rock cores collected from Niche #1.

Alcove 5 (Thermal Testing Facility Access/Observation Drift, Connecting Drift, and Heated Drift)

In accordance with the established test plan, power to the heated drift was turned off in mid-January 2002, and cool-down of the facility is currently being monitored. DOE is performing periodic water sampling, gas sampling, neutron logging, and electrical resistance tomography. Visual observations of the heated drift are performed weekly from the observation window in the thermal test bulkhead. A video log the length of the thermal test facility was done once per week in January and once every other week in February. Ground penetrating radar imaging was done before shutting off the heater and again at the end of February. Air permeability tests were done two weeks after shut off and again three weeks later. Some spalling of the rock (approximately the size and shape of dinner plates) in the heated drift has been observed since heater shut off. The significance of this is unclear since some spalling was observed before heater shut off. The data being collected is primarily being used as input to the Thermal Testing AMR.

Regarding the study of elevated fluoride concentrations in water samples, DOE has produced a "white paper" that evaluates the likely sources of elevated fluoride. The OR office received a draft copy. The report concludes that "The results of the field test confirm the hypothesis that the source of the fluoride...is the introduced test materials (i.e. Viton™ and/or Teflon™)." Laboratory work is continuing to further evaluate these results.

Fluid Inclusion Study

In October 2001 UNLV's report was sent to DOE in draft form, in two parts. The report comments on the timing of thermal fluids at Yucca Mountain. Based on two different approaches, fluids with elevated temperatures were present at Yucca Mountain more than 2.9 million years ago. DOE provided an update on the fluid inclusion studies at the NWTRB meeting in Pahrump, NV during January 29-30, 2002. They quoted from the UNLV study as follows: "Results . . . provide no evidence for the former presence of upwelling hydrothermal fluids . . . Alternatively, results are consistent with infiltration of a cooling-off tuff sequence by descending meteoric water . . . This study demonstrates that the hypothesis of geologically recent upwelling hydrothermal fluids is untenable and should not disqualify Yucca Mountain as a potential nuclear waste storage site." DOE stated that the State of Nevada is withholding conclusions until they have reviewed the UNLV report. Overall, DOE concludes that ". . . the 'upwelling waters' or 'seismic pumping' hypotheses for the origin of secondary mineralization

at the Yucca Mountain site have been adequately addressed and may be discounted.”

Laser Strainmeter (LSM) Test

Construction of strainmeter niche monuments and installation of the instrument enclosure and electrical terminations is complete. Between the monuments, the “track” through which the laser will be aimed is being aligned. The University of California, San Diego anticipates setting up for LSM operation at the end of March. DOE’s test schedule indicates that the LSM is expected to be operational by early summer of 2002.

SURFACE-BASED TESTING

Alluvial Tracer Complex (ATC)

The ATC is a joint Nye County and DOE Cooperative Program to investigate flow and transport properties of the saturated alluvium. Single-well ATC hydrologic and tracer testing at well NC-EWDP-19D/D1 (Enclosures 3 and 4) has been completed. Cross-well hydrologic and tracer testing will also be performed at NC-EWDP-19D/D1.

Confirmatory tests have been run to ensure that the test intervals in well NC-EWDP-19D1 are properly isolated from each other. As documented in the previous OR report, preliminary testing was conducted from December 18-20, 2001. During this reporting period, two new tests were performed. The first test involved a 48-hour test that began on January 4, 2002, with pumping of interval #5 in borehole 19D1 and monitoring of all intervals in observation well IM1. The second test, which started on January 8, 2002, concerned another 48-hour test pumped from interval #4 in well 19D1 and monitored all intervals in well IM1. Analysis of all three tests indicates that leakage from intervals 5, 6, and 7 in well 19D1 to interval 4 of well 19D1 would not exceed a few percent of the pumping rate in interval 4 of well 19D1. Cross-hole tracer testing is expected to proceed with pumping from interval #4 in well 19D1. Interval #4 is the deepest zone in saturated alluvium. Equipment installation was completed on January 24, 2002, in well IM2 to support tracer injection and testing and tracer injection began on February 26, 2002.

Two open-hole hydraulic tests were performed in January 2002. Both tests pumped from well 19D1 and the monitored results were observed in well IM2. The first was a 48-hour test that began on January 26, 2002. The various intervals in well IM2 were packed off to evaluate their individual responses to pumping. For the second test on January 29, 2002, the IM2 observation well was kept in an “open hole” configuration.

During this reporting period DOE sent a permit request to the State of Nevada to seek approval for tracers to be used in the cross-hole tests.

On February 27, 2002, the ORs visited the ATC, located just outside the southwestern boundary of the Nevada Test Site. Nye County and the U.S. Geological Survey are conducting hydraulic and tracer tests at well 19P1. The last of the single-well tracer tests in 19P1 was completed during the ORs visit. The next part of the testing program will include cross-hole tracer tests, in which tracers will be introduced via observation wells 19 IM1 and 19 IM2. Well

19P1 will be pumped during those tests to recover the tracers through lateral flow from the observation wells. However, these tracer tests will not be scheduled to begin until the State of Nevada approves the specific groundwater tracers that are planned to be used.

Unsaturated Zone (UZ) Monitoring

For approximately 10 years continuous measurements of unsaturated zone conditions have been collected in boreholes NRG7A and UZ4/5. The generators at the borehole sites have been shut down bringing surface monitoring to an end. However, extensive UZ monitoring will continue in the ES and ECRB.

Waste Handling Building Geotechnical Investigation

DOE has completed the field work for the geotechnical investigation at the Yucca Mountain North Portal area. This investigation was collecting data for the design of a waste handling building for a potential repository. DOE continued the work of integrating geotechnical information collected from drilling and geophysical logging of 15 shallow boreholes and four test pits. Draft reports are under development. Final reports on these activities are expected to be submitted to DOE by mid-April 2002.

Characterization of Near Surface Velocity Structure

DOE has been collecting near surface velocity data at Yucca Mountain to help design surface and subsurface facilities for a potential repository. DOE has completed the Spectral Analysis of Surface Waves surveys to assess shear wave profiles of shallow rock units at Yucca Mountain. Testing has also been completed to extend the near surface velocity structure characterization to the potential repository horizon. Analysis modeling and documentation for this activity is expected to be completed in July 2002.

BUSTED BUTTE UNSATURATED ZONE TRANSPORT TEST

Phase II tracer testing was conducted in a separate 10 X 10 X 6 meter block of rock and this testing was completed in December 2000. DOE completed post-test characterization of Phase II tracer testing and the site was closed. The completed work activities (e.g., overcoring selected injection boreholes, partial mine-back of the test block, and rock sampling and analyses), were performed to better characterize the distribution of reactive and nonreactive tracers. Prior to the closure of this test site, DOE completed the partial mine-back and sampling of the Phase II block. Atomic Energy of Canada, LTD., continues to perform radionuclide transport testing on blocks of rock extracted from the Busted Butte Test Facility. Chemically reducing conditions have been found within a block and the reasons for this are being reviewed. A progress report on this issue is scheduled to be released in mid-March, 2002.

ENGINEERED BARRIER SYSTEM (EBS) TESTING

The EBS Operations Office of the Yucca Mountain Project continues to perform EBS testing. These tests are performed in a Pilot Scale Test Facility located in North Las Vegas (Atlas

facility). Test results are used to support the EBS degradation and transport process model report.

Pilot Scale Testing - Pre-closure Ventilation Test

DOE has developed a test plan for Phase III of the EBS ventilation testing; however, these activities have not been initiated. As currently envisioned this test would add moisture to the porous media in the simulated invert to determine the effect on ventilation efficiency.

Pilot Scale Testing - Post-closure Ventilation Test

DOE is also performing a test to study the convective heat transfer in the post-closure time period. This test is currently underway at the EBS test facility.

7.0 GENERAL ACTIVITIES

a. Documents Issued

N/A

b. Meetings

Meeting of the Nuclear Waste Technical Review Board

On January 29-30, 2002, NRC and Center for Nuclear Waste Regulatory Analyses staff, including the ORs, attended the winter meeting of the Nuclear Waste Technical Review Board, held in Pahrump, Nevada. Presentations were made on a variety of topics including: scientific updates of site investigations by DOE contractors; external reviews of DOE's suitability documents by NRC's Advisory Committee on Nuclear Waste, the U.S. Geological Survey, a contractor for Clark County, Nevada, and the international peer review jointly organized under the Nuclear Energy Agency of the Organization for Economic Cooperation and Development and the International Atomic Energy Agency; and regulatory considerations and developments presented by DOE contractors and NRC staff. Specifically, NRC staff presented overviews of 10 CFR Part 63 and the sufficiency comments provided to DOE.

Meeting with Department of Energy on Key Technical Issue Resolution

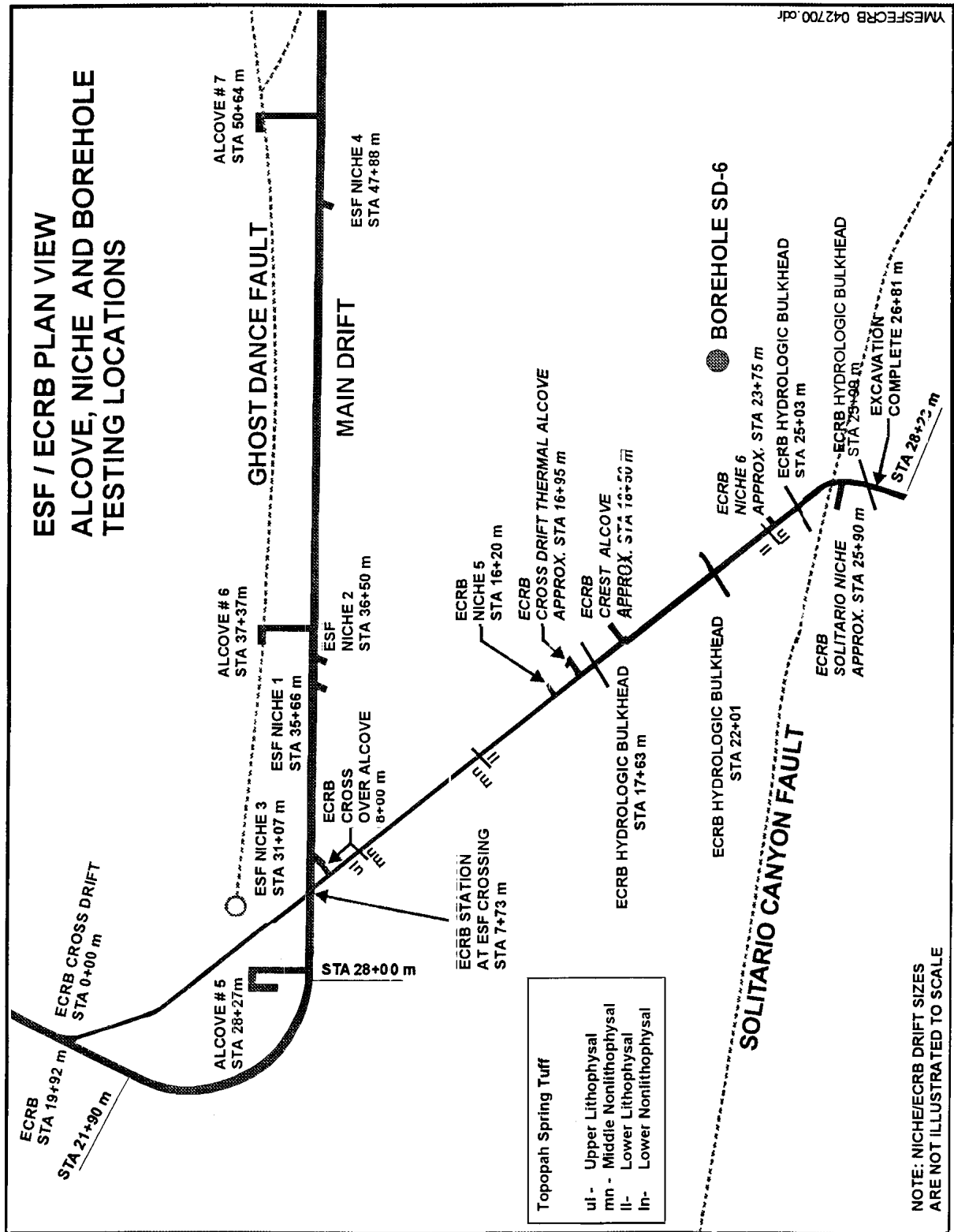
On February 5, 2002, NRC and CNWRA staff, including the ORs, conducted a technical exchange with DOE in Las Vegas, Nevada. The purpose of the meeting was to discuss future KTI resolution meetings. Both DOE and the NRC staff proposed several future meetings. The goal of the future meetings is to reach issue resolution. The NRC staff stated that its KTI leads are the main points of contact and are responsible for their agreements. In addition, NRC staff stated that its KTI leads should communicate with their DOE counterparts, to understand DOE's plans and schedule to address specific agreements. DOE responded that its KTI leads are also accountable for their agreements. DOE stated that it has asked its KTI leads to communicate more with their NRC counterparts. NRC concluded the meeting by stressing three points. First, the issue resolution process needs to move forward. Second, the staff needs to understand

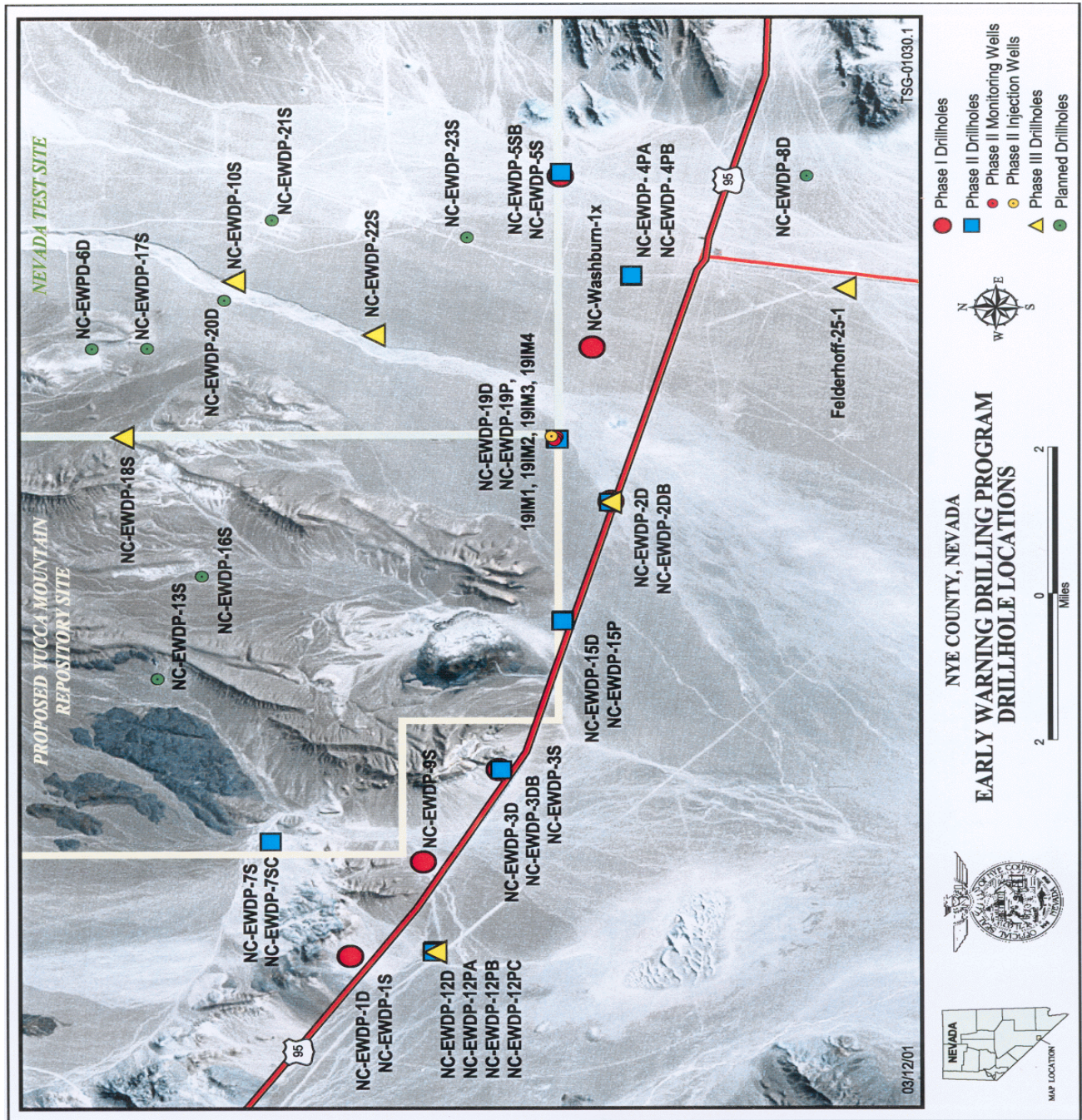
DOE's plans for addressing all the agreements. Finally, NRC needs DOE to communicate how it plans to address agreements due to NRC during the current fiscal year, given that DOE is currently rebaselining its program. We expect DOE to provide additional information on its plan for resolving the KTIs in March, 2002.

c. Site Visits

The ORs visited the north portal area at Yucca Mountain on February 27th for training purposes. This training was required for staff to have unescorted access to underground areas at the site, and to be qualified to escort other personnel underground. The training covered CPR, first aid, and both hearing and respiratory protection.

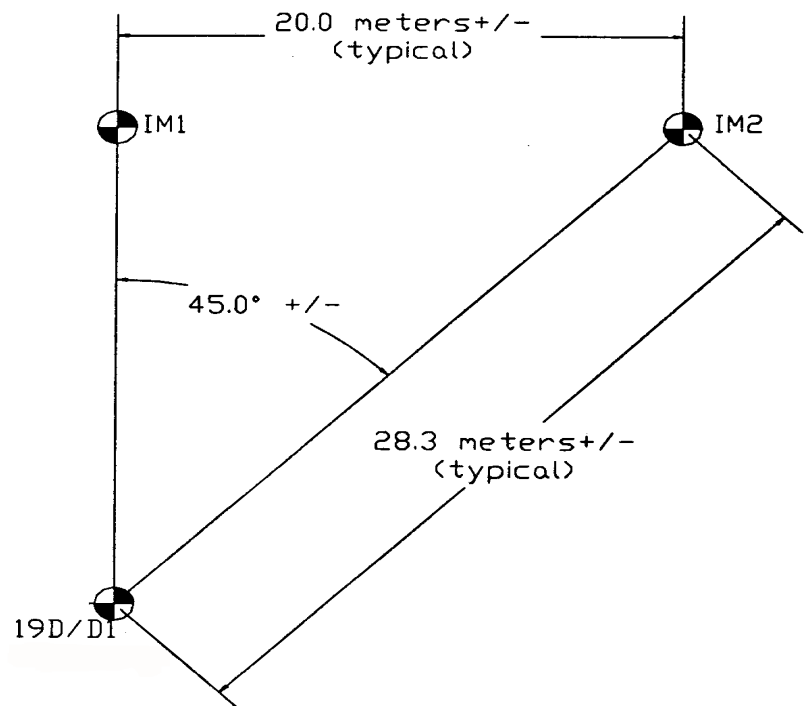
There were no outstanding issues raised as a result of this visit.







ATC SITE LAYOUT



ATC Cross-Hole Configuration
05/02/01 ATCLO_1.dwg